tude 152° 30′ [west ?]. The heavy pack formation of the young ice caused the expedition to seek winter quarters in Victoria Land. The ship was frozen in March 24, 1902. The expedition passed a comfortable winter in well-sheltered quarters. The lowest recorded temperature was 62° F. below zero. Sledging commenced September 2, 1902; parties being sent out in all directions. That under the command of the chief of expedition traveled 94 miles to the south, reaching land in latitude 80° 18′ south, longitude 163° west, establishing a world's record for the farthest point south. The party found that ranges of high mountains continue through Victoria Land. At the meridian of 160° west, foot hills much resembling the Admiralty Range were discovered. The ice barrier is presumably afloat. It continues horizontal and is slowly fed from the land ice. Mountains ten or twelve thousand feet high were seen in latitude 82° south, the coast line continued beyond, at least as far as 83° 20′, nearly due south.

NOTE ON THE BAROMETRIC PRESSURE AT COLON.

By General HENRY L. ABBOT, dated May 30, 1903.

The data for August, September, and October, 1902, at Colon, referred to in the MONTHLY WEATHER REVIEW, March, 1903, p. 143, having been communicated to me in all their details, I am now able to complete the study of the mean barometric pressure at this place at sea level.

Hour.	Millimeter.	Hour.	Millimeter.
1 a. m.	757.99	2 p. m.	757.24
2 a. m.	757.70	3 p. m.	756.76
3 a. m.	757.40	4 p. m.	756.63
4 a. m.	757.34	5 p. m.	756.71
5 a. m.	757.44	6 p. m.	756.91
6 a. m.	757.65	7 p. m.	757.25
7 a. m.	758.02	8 p. m.	757.64
8 a. m.	758.57	9 p. m.	758.05
9 a. m.	758.96	10 p. m.	758.28
10 a. m.	759.06	11 p. m.	758.40
11 a. m.	758.83	Midnight	758.33
Noon	758.41		
1 p. m.	757.74	Mean for the 24 hours.	757.80

First, as to reduction to sea level. Using Guyot's Tables I adopt for Colon (25 feet elevation) a correction of + 0.026 inch. I am informed that "+ 0.02 inch was used for several weeks until + 0.03 was authorized and this is now used." So there is no sensible difference in our methods of reduction. For Alhajuela I adopted (height 43.7 meters or 143 feet) a correction ranging from + 3.74 to 3.78 millimeters according to the corresponding air temperature, say + 0.147 to + 0.149 inch. This, by comparison with the above Weather Bureau figure at Colon, seems to be in good accord. From a note that I wrote at Paris, in 1900, giving, in French units, the full hourly record for eight months in 1898 and 1899 at Colon, I quote the preceding hourly means.

This indicates a correction, to reduce an 8 a. m. reading to the mean for twenty-four hours, of —0.77 millimeter. Referring to each of the eight months I find the differences to be: October, — 0.8; November, — 0.8; December, — 0.8; January, — 0.8; February, — 0.6; March, — 0.8; April, — 0.8; May, — 0.9; mean of the eight months, — 0.79.

Unfortunately October is the only month common to the two series of these Weather Bureau records for 1898 and 1903, but in view of the above uniformity of the value of the reduction from 8 a. m., observations to the mean of the twenty-four hours, I think we may safely adopt a value at Colon of — 0.80 millimeters. Hence, the computation by the Editor on page 143, becomes as given in the following table, in millimeters for sea level:

Year, 1902.		August.	September.	October.
Weather Bureau barometer	Mean, 8 a. m.	757.56	758.18	758.73
	Correction	—0.80	—0.80	—0.80
	Mean, 24 hours	756.76	757.38	757.93
Panama Company's barograph.	Readings	762.51	762.88	763.64
	Corrections	—5.75	—5.50	—5.71

This computation gives a mean correction of —5.65 millimeters for the barograph. By using the Alhajuela horary curve the Editor found the correction to be —6.00, while my comparison with the records on the northern shore of South America gave —3.90 millimeters. These three values for the correction, converted to inches, become: —0.022, —0.024, and —0.015, with a largest discrepancy of 0.0083. I shall adopt —5.65 millimeters as probably the better value, and the small discrepancies obtained by such different methods make me believe it to be quite satisfactory. The mean reading at sea level at Alhajuela is then 757.86 millimeters, or 29.840 inches. The mean reading of the hourly series made by the Weather Bureau at Colon for eight months in 1898–99 was 29.866 inches.

NOTES AND EXTRACTS.

CLIMATIC FACTORS IN RAILROAD ENGINEERING.

A thesis on the above subject has been prepared by R. M. Brown as a part of his course in general climatology at Harvard University and has been published in the Journal of Geography for April, 1903. The struggle of railroads against climatic conditions has been recorded so fully during the past century as to become exceedingly instructive and the influence of the various climatic factors is presented one by one in Mr. Brown's memoir.

As to heavy precipitation he notes that the rainy seasons are often followed by droughts and this alternation destroys all woodwork either by shrinkage and splintering or by the growth of fungi. Railroad ties decay when there is a good supply of moisture and when the temperature is between 32° and 150°. Data on these points are given for India, South Africa, Central Africa, and Central America.

The diseases that are considered peculiar to climate, such as cholera, malarial fevers, and yellow fever offer difficulties that must be overcome. The experiences of numerous large railroad undertakings are mentioned. The droughts that occur in some locations require the building of huge tanks while in other cases one must go a long distance to obtain pure water. Outdoor work can not well be done in the rainy weather and laborers accustomed to hot dry weather lose many days in the rainy season.

The floods and damages by heavy rains are matters of great importance and "are registered on the books of the construction companies with unceasing regularity. * * * The history of every road that traverses the belt of heavy precipitation is a story of continual struggle against floods." In regions of heavy rainfall land slips are frequent and a long list of these is given by the author.

The ballast on the roadbed appropriate to the long, dry season is not appropriate to the heavy-rain season. In general, the ballast produces dust haze sufficient to obscure the approaching train, the dust also penetrates the machinery, causing hot axles and other damage. In America and England under most conditions, stone ballast is the more expensive but in India the climate reverses this rule.

In regions of moderate precipitation whether of rain or snow, the length and weight of the freight trains is determined by the weather; thus, on the Pennsylvania Railroad west of Pittsburg, the load assigned to an engine is 1750 tons in good weather and 1225 in bad weather. On the Union Pacific road the snow offers great obstacles, about 2 per cent of the entire expense of the road is credited to the removal of snow and repairs of snow sheds. The Iquique Railroad of Chili reports increased cost of working during fogs which produce slippery rails.

In regions of light precipitation, or drought, railroad ties